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QUIZZES

Practice test 1 Unit 9



10 Questions



7 min

Topics

Electromagnetic induction, Faraday's Law,
Application in seismometer, Motional emf

Start Quiz

SAEED MDCAT

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06 : 58



1/10



7 min



Hint

Q : Lenz's law is a consequence of the law of conservation of

A

energy

B

charge

C

momentum

D

none of these

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SAEED MDCAT TEAM



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1

2

3

4

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6

7

06 : 56



2/10



7 min



Hint

Q : A copper rod of length l is rotated about the end perpendicular to the uniform magnetic field B with constant angular velocity ω . The induced emf between its two ends is

A

zero

B

 $B\omega l^2$

C

 $\frac{1}{2}B\omega l^2$

D

 $\frac{1}{4}B\omega l^2$

SAEED MDCAT

SAEED MDCAT TEAM



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1

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7

06 : 54



3/10



7 min



Hint

Q : The cause of induced emf is

A

rate of change of flux

B

increase in flux

C

decrease in flux

D

change in flux

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SAEED MDCAT TEAM



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1

2

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4

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7

06 : 52



4/10



7 min



Hint

Q : Alternating emf is produced by rotating a rectangular coil of wire in

A

magnetic field

B

electric field

C

conservative field

D

gravitational field

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1

2

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4

5

6

7

06 : 50



5/10



7 min



Hint

Q : The magnitude of motional emf is given by

A

$$\varepsilon = -vBL \sin\theta$$

B

$$\varepsilon = -vBL \cos\theta$$

C

$$\varepsilon = vBL \tan\theta$$

D

$$\varepsilon = vBL \sin\theta$$

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1

2

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4

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6

7

06 : 47



6/10



7 min



Hint

Q : The motional emf depends upon

A

strength of magnet

B

length of conductor

C

speed of conductor

D

all of these

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1

2

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7

06 : 44



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7/10



7 min



Hint

Q : The motional emf induced in a rod moving perpendicular to a magnetic field is given by

A

$$\epsilon = -vBL$$

B

$$\epsilon = 0$$

C

$$\epsilon = vBL$$

D

$$\epsilon = -1$$

SAEED MDCAT

SAEED MDCAT TEAM



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1

2

3

4

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6

7

06 : 41



8/10



7 min



Hint

Q :

In the diagram shown if a bar magnet is moved along the common axis of two single turn coils A and B in the direction of arrow



A

Current is induced only in A & not in B

B

Induced currents in A & B are in the same direction

C

Current is induced only in B and not in A

D

Induced currents in A & B are in opposite directions



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4

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10

06 : 38



9/10



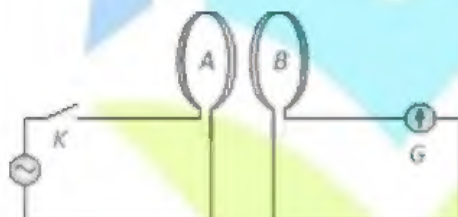
7 min



Hint

Q:

The diagram below shows two coils A and B placed parallel to each other at a very small distance. Coil A is connected to an ac supply. G is a very sensitive galvanometer. When the key is closed



A

Constant deflection will be observed in the galvanometer for 50 Hz supply

B

Visible small variations will be observed in the galvanometer for 50 Hz input

C

Oscillations in the galvanometer may be observed when the input ac voltage has a frequency of 1 to 2 Hz

D

No variation will be observed in the galvanometer even when the input ac voltage is 1 or 2 Hz

4

5

6

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9

10

Q:

The laws of electromagnetic induction have been used in the construction of a

- ☐ galvanometer
- ☐ voltmeter
- ☐ electric motor
- ☐ generator

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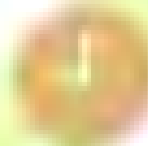
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QUIZ RESULT

Practice test 1 Unit 9



Time



Score



0/10

0%

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Correct



Unanswered



Incorrect



1/10

Q : Lenz's law is a consequence of the law of conservation of



energy



charge



momentum



none of these

Explanation

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Basic concept



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correct



2/10

Q : A copper rod of length ℓ is rotated about the end perpendicular to the uniform magnetic field B with constant angular velocity ω . The induced emf between its two ends is



zero



$B\omega\ell^2$



$\frac{1}{2}B\omega\ell^2$



$\frac{1}{4}B\omega\ell^2$

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Explanation



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$$\text{Average emf} = \frac{0 + Bv\ell}{2} = \frac{1}{2}Bv\ell = \frac{1}{2}B\ell\omega$$



Correct



3/10



Incorrect



3/10

Q : The cause of induced emf is



rate of change of flux



increase in flux



decrease in flux



change in flux

Explanation

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$$\varepsilon = -N \frac{\Delta\phi}{\Delta t}$$

$$\varepsilon \propto \frac{\Delta\phi}{\Delta t}$$

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Correct



Unanswered



Incorrect



4/10

Q : Alternating emf is produced by rotating a rectangular coil of wire in



magnetic field



electric field



conservative field



gravitational field

Explanation

SAEED MDCAT TEAM

$$\epsilon = \omega E L \sin \theta$$



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correct



5/10

Q : The magnitude of motional emf is given by



$$\epsilon = vBL \sin\theta$$



$$\epsilon = -vBL \cos\theta$$



$$\epsilon = vBL \tan\theta$$



$$\epsilon = vBL \sin\theta$$

Explanation

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correct



6/10

Q : The motional emf depends upon



strength of magnet



length of conductor



speed of conductor



all of these

Explanation

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Correct



Estimated



Incorrect



7/10

Q : The motional emf induced in a rod moving perpendicular to a magnetic field is given by



$$\varepsilon = -vBL$$



$$\varepsilon = 0$$



$$\varepsilon = vBL$$



$$\varepsilon = -1$$

Explanation

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Formula



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Correct

:

Unattempted



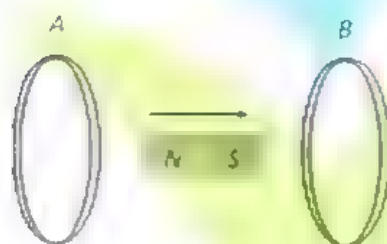
Incorrect



8/10

Q:

In the diagram shown if a bar magnet is moved along the common axis of two single turn coils A and B in the direction of arrow



Current is induced only in A & not in B



Induced currents in A & B are in the same direction



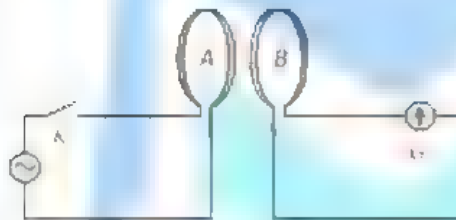
Current is induced only in B and not in A



Induced currents in A & B are in opposite directions

Q:

The diagram below shows two coils A and B placed parallel to each other at a very small distance. Coil A is connected to an ac supply. G is a very sensitive galvanometer. When the key is closed



- ☐ Constant deflection will be observed in the galvanometer for 50 Hz supply
- ☐ Visible small variations will be observed in the galvanometer for 50 Hz input
- ☒ Oscillations in the galvanometer may be observed when the input ac voltage has a frequency of 1 to 2 Hz
- ☐ No variation will be observed in the galvanometer even when the input ac voltage is 1 or 2 Hz

Explanation

At low frequency of 1 to 2 Hz, oscillations may be observed as our eyes will be able to detect it.



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correct



10/10

Q:

The laws of electromagnetic induction have been used in the construction of a



galvanometer



voltmeter



electric motor



generator

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QUIZZES

Practice test 2 Unit 9

100 Questions

1 Test

100 Marks

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Q : The phenomenon in which a changing current in a coil induces an e.m.f in itself is called.

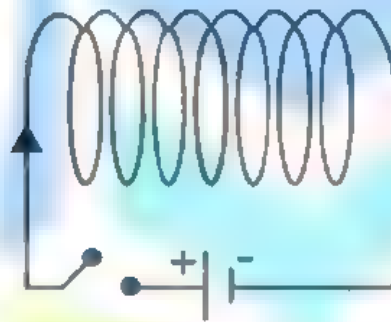
- ☐ Mutual inductance
- ☒ Mutual induction
- ☐ Self inductance
- ☐ Self induction

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SAEED MDCAT TEAM

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Q : A solenoid is shown in the figure such that switch is closed and then opened. An emf is induced during.



☐ current was decreasing

☐ current was increasing

☒ current was changing

☐ current was constant.

Q : The unit of ratio of self inductance to the mutual inductance is

- ☐ Henry
- ☐ tesla
- ☐ VsA
- ☐ no unit

SAEED MDCAT

SAEED MDCAT TEAM

SAEEDMDCAT

Q:

The current flowing in two coaxial coils in the same direction. On increasing the distance between the two, the electric current will

- ☐ A) Increase
- ☐ B) Decrease
- ☐ C) Remain unchanged
- ☐ D) The information is incomplete

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SAEED MDCAT TEAM

SAEEDMDCAT

Q:

A magnet is brought towards a coil (i) speedily (ii) slowly then the induced e.m.f./induced charge will be respectively

- ☐ More in first case / More in first case
- ☐ More in first case/Equal in both case
- ☐ Less in first case/More in second case
- ☐ Less in first case/Equal in both case

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SAEED MDCAT TEAM

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Q:

metallic ring connected to a rod oscillates freely like a pendulum. If now a magnetic field is applied in horizontal direction so that the pendulum now swings through the field, the pendulum will



Keep oscillating with the old time period



Keep oscillating with a smaller time period



Keep oscillating with a larger time period



Come to rest very soon



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Q:

If a coil of metal wire is kept stationary in a non-uniform magnetic field, then

- ☐ An e.m.f. is induced in the coil
- ☐ A current is induced in the coil
- ☐ Neither e.m.f. nor current is induced
- ☐ Both e.m.f. and current is induced

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SAEED MDCAT TEAM

SAEEDMDCAT

Q:

When a bar magnet falls through a long hollow metal cylinder fixed with its axis vertical, the final acceleration of the magnet is

- ☐ Equal to zero
- ☐ Less than g
- ☐ Equal to g
- ☐ Equal to g in to beginning and then more than g

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SAEED MDCAT TEAM

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Q:

Choke coil works on the principle of

- ☐ transient current
- ☒ self-induction
- ☐ mutual induction
- ☐ watt less current

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f SAEEDMDCAT

Q:

Whenever, current is changed in a coil, an induced e.m.f. is produced in the same coil. This property of the coil is due to

☐ mutual induction

☐ self-induction

☐ eddy currents

☐ hysteresis

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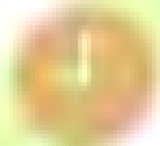
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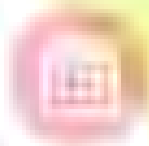


QUIZ RESULT

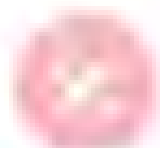
Practice test 2 Unit 9



Time



Score



C/10

0%

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Correct



1/10

Q : The phenomenon in which a changing current in a coil induces an e m f in itself is called



Mutual inductance



Mutual induction



Self inductance



Self induction

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Correct



Unattempted

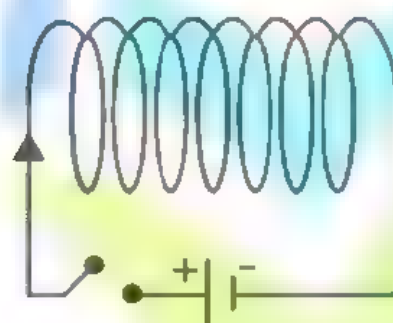


Incorrect



2/10

Q : A solenoid is shown in the figure such that switch is closed and then opened. An emf is induced during.



current was decreasing



current was increasing



current was changing



current was constant.



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Correct



Incorrect



Correct



3/10

Q : The unit of ratio of self inductance to the mutual inductance is



Henry



tesla



VsA



no unit

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Correct

Unattempted



Incorrect



4/10

Q:

The current flowing in two coaxial coils in the same direction. On increasing the distance between the two, the electric current will



Increase



Decrease



Remain unchanged



The information is incomplete

Explanation

Induced current in both the coils assist the main current so current through each coil increases.



Q:

The current flowing in two coaxial coils in the same direction. On increasing the distance between the two, the electric current will



Increase



Decrease



Remain unchanged



The information is incomplete

Explanation

Induced current in both the coils assist the main current so current through each coil increases.





Correct

:

Unattempted



Incorrect



5/10

Q:

A magnet is brought towards a coil (i) speedily (ii) slowly then the induced e.m.f./induced charge will be respectively



More in first case / More in first case



More in first case/Equal in both case



Less in first case/More in second case



Less in first case/Equal in both case

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Explanation

The magnitude of induced e.m.f. is directly proportional to the rate of change of magnetic flux
Induced charge doesn't depend upon time.



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100%

100%



correct



6/10

Q:

metallic ring connected to a rod oscillates freely like a pendulum. If now a magnetic field is applied in horizontal direction so that the pendulum now swings through the field, the pendulum will



Keep oscillating with the old time period



Keep oscillating with a smaller time period



Keep oscillating with a larger time period



Come to rest very soon



correct



7/10

Q:

If a coil of metal wire is kept stationary in a non-uniform magnetic field, then



An e.m.f. is induced in the coil



A current is induced in the coil



Neither e.m.f. nor current is induced



Both e.m.f. and current is induced

Explanation

E.m.f. or current induces, only when flux linked with the coil changes.



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correct



8/10

Q:

When a bar magnet falls through a long hollow metal cylinder fixed with its axis vertical, the final acceleration of the magnet is



Equal to zero



Less than g



Equal to g



Equal to g in to beginning and then more than g

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Correct



Estimated



Incorrect



9/10

Q:

Choke coil works on the principle of



transient current



self-induction



mutual induction



watt less current

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correct



10/10

Q:

Whenever, current is changed in a coil, an induced e.m.f. is produced in the same coil. This property of the coil is due to



mutual induction



self-induction



eddy currents



hysteresis

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QUIZZES

Practice test 3 Unit 9

10 Questions

1 hour

10 Marks

Start Quiz

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Q : A coil having number of turns N and cross-sectional area A is rotated in a uniform magnetic field B with an angular velocity ω . The maximum value of the emf induced in it is

☐ $\frac{NBA}{\omega}$

☐ $\frac{NBA}{\omega^2}$

☐ $NBA\omega$

☐ $NBA\omega^2$

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SAEED MDCAT TEAM

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Q : The stator consist of group of _____

- ☐ coils
- ☐ bar magnets
- ☐ electromagnets
- ☐ rings

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SAEED MDCAT TEAM

 SAEEDMDCAT

Q : A sinusoidal current is represented by the equation $I = I_0 \sin \theta t$. Which equation represents the sinusoidal current with both its frequency and amplitude doubled?

☐ $2I = I_0 \sin 2\theta t$

☐ $I = I_0 \sin 2\theta t$

☐ $I = 2I_0 \sin 2\theta t$

☐ $I = I_0 \sin \frac{1}{2} \theta t$

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SAEED MDCAT TEAM

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Q : When the motor is loaded then

- ☐ speed of motor decrease
- ☐ back emf decrease
- ☐ flow of current increase
- ☐ all of above

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SAEED MDCAT TEAM

f SAEEDMDCAT

Q : A generator produces 100V when rotated at certain speed. If its speed of rotation is doubled what will be the output voltage,



100V



200V



50V



none of these

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SAEED MDCAT TEAM



SAEEDMDCAT



Q : A rectangular coil $0.20 \text{ m} \times 0.10 \text{ m}$, of 100 turns, rotates in a magnetic field of $3 \times 10^{-3} \text{ T}$ with a frequency of 20 Hz, about an axis normal to the magnetic field. What is the maximum value of induced emf?

☐ 0.12 $\pi \text{ V}$

☒ 0.18 $\pi \text{ V}$

☐ 0.24 $\pi \text{ V}$

☐ 0.30 $\pi \text{ V}$

SAEED MDCAT

SAEED MDCAT TEAM

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Q : Faraday's generator with which he was able to produce a continuous induced current called

- ☐ tri polar generator
- ☒ multipolar generator
- ☐ dipolar generator
- ☐ homopolar generator

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SAEED MDCAT TEAM

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Q:

The armature is rotated by a

- ☐ turbine by a water fall
- ☒ fuel engine
- ☐ both a and b
- ☐ none of these

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SAEED MDCAT TEAM

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Q : A dynamo converts

- ☐ electrical energy into mechanical energy
- ☒ mechanical energy into electrical energy
- ☐ magnetic energy into electrical energy
- ☐ heat energy into electrical energy

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Q : An A.C is measured with the help of

- ☐ heating effect
- ☐ magnetic effect
- ☐ chemical effect
- ☐ both a and b

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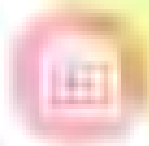


QUIZ RESULT

Practice test 3 Unit 9



Time



Score



C/10



0%

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correct



1/10

Q : A coil having number of turns N and cross sectional area A is rotated in a uniform magnetic field B with an angular velocity ω . The maximum value of the emf induced in it is



$$\frac{NBA}{\omega}$$



$$\frac{NBA}{\omega^2}$$



$$NBA\omega$$



$$NBA\omega^2$$

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Explanation



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$$\text{emf} = NwAB\sin\theta, \theta = 90^\circ$$



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Correct



Unattempted



Incorrect



2/10

Q : The stator consist of group of _____



coils



bar magnets



electromagnets



rings

Explanation

SAEED MDCAT TEAM



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Q: A sinusoidal current is represented by the equation $I = I_0 \sin \theta t$. Which equation represents the sinusoidal current with both its frequency and amplitude doubled?

☐ $2I = I_0 \sin(2\theta t)$

☐ $I = I_0 \sin 2\theta t$

☒ $I = 2I_0 \sin(2\theta t)$

☐ $I = I_0 \sin\left(\frac{1}{2}\theta t\right)$

Explanation

Now, $I = I_0 \sin \theta t = I_0 \sin(2\pi f t)$ where f is the frequency.

Since f and I_0 are both doubled, the corresponding sinusoidal current is thus

$$\begin{aligned} I &= 2I_0 \sin[2\pi(2f)t] = 2I_0 \sin[2 \cdot 2\pi f t] \\ &= 2I_0 \sin 2\theta t \end{aligned}$$



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correct



4/10

Q : When the motor is loaded then



speed of motor decrease



back emf decrease



flow of current increase



all of above

Explanation

Basic concept



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Q : A generator produces 100V when rotated at certain speed. If its speed of rotation is doubled what will be the output voltage,

- ☐ 100V
- ☒ 200V
- ☐ 50V
- ☐ none of these

Explanation

As,

$$\varepsilon = N\omega AB \sin \theta$$

$$\Rightarrow \varepsilon \propto \omega$$

$$\Rightarrow \frac{\varepsilon_1}{\varepsilon_2} = \frac{\omega_1}{\omega_2}$$

$$\Rightarrow \frac{100}{\varepsilon_2} = \frac{\omega}{2\omega} = \frac{1}{2}$$

$$\Rightarrow \varepsilon_2 = 200 \text{ V}$$



Correct



Unattempted



6/10

Q : A rectangular coil $0.20 \text{ m} \times 0.10 \text{ m}$, of 100 turns, rotates in a magnetic field of $3 \times 10^{-3} \text{ T}$ with a frequency of 20 Hz, about an axis normal to the magnetic field. What is the maximum value of induced emf?

0.12 $\pi \text{ V}$ 0.18 $\pi \text{ V}$ 0.24 $\pi \text{ V}$ 0.30 $\pi \text{ V}$

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SAEED MDCAT TEAM

Explanation

$$E_0 = NBA\omega$$

$$E_0 = 100 \times 3 \times 10^{-3} \times 0.20 \times 0.10 \times 2\pi \times 20$$

$$= 0.24 \pi \text{ volt}$$



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Correct

:



Unattempted



Incorrect



7/10

Q : Faraday's generator with which he was able to produce a continuous induced current called



tri polar generator



multipolar generator



dipolar generator



homopolar generator

Explanation

SAEED MDCAT TEAM

Faraday's homopolar disc generator by which was able to produce a continuous induced current.

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Correct



Unattempted



Incorrect



8/10

Q:

The armature is rotated by a



turbine by a water fall



fuel engine



both a and b



none of these

Explanation

SAEED MDCAT TEAM

Armature is rotated by fuel engine or by a water fall.



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Correct



Correct Answer



Incorrect



9/10

Q : A dynamo converts



electrical energy into mechanical energy



mechanical energy into electrical energy



magnetic energy into electrical energy



heat energy into electrical energy

Explanation

Dynamo convert
 $M.E \rightarrow E.E$



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Answer



Explanation



Correct



10/10

Q : An A.C is measured with the help of



heating effect



magnetic effect



chemical effect



both a and b

Explanation

All A.C meters use magnetic effect for detection of current.



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QUIZZES

Practice test 4 Unit 9

10 Questions

7 Marks

10 Minutes

Start Quiz

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Q : If the current in the primary coil and number of turns in it are I_p and N_p respectively and the number of turns and current in the secondary are N_s and I_s respectively then the value the of $N_s:N_p$

☐ $I_s : I_p$

☐ $I_p : I_s$

☐ $\frac{I_s}{I_p}$

☐ $\frac{I_p}{I_s}$

SAEED MDCAT

SAEED MDCAT TEAM

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Q : The device in which induced e.m.f is statically induced e.m.f is

- ☒ Transformer
- ☐ Generator
- ☐ Alternator
- ☐ Dynamic

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Q : Step up transformer has transformation ratio of 3 :2 what is voltage in secondary if voltage in primary is 30 V?

☐ 45V

☐ 15V

☐ 90V

☐ 300V

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Q : Which of the following quantity remain same in the transformer

- ☐ Current
- ☒ Frequency
- ☐ Voltage
- ☐ All of these

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Q : Power loss in actual transformer is due to_____

- ☐ small output
- ☒ eddy currents and magnetic hysteresis
- ☐ soft iron core
- ☐ back emf

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Q : The out put voltage of a transformer is 3 times the input voltage then turns ratio will be_____

- ☐ 1/3
- ☒ 3
- ☐ 1
- ☐ 6

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Q : In a transformer 220 ac voltage is increased to 2200 volts. If the number of turns in the secondary are 2000, then the number of turns in the primary will be

☐ 100

☒ 150

☐ 200

☐ 20

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Q : If the current in the primary coil and number of turns in it are I_p and N_p respectively and the number of turns and current in the secondary are N_s and I_s respectively then the value the of $N_s:N_p$

☐ $I_s : I_p$

☐ $I_p : I_s$

☐ $\frac{I_p}{I_s}$

☐ $\frac{I_s}{I_p}$

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Q : If electron is moving from A to B in wire Ab, then current induced in the coil is

- ☐ anticlockwise
- ☒ clockwise
- ☐ no current will be induced
- ☐ arbitrary direction

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Q:

The core of a transformer is laminated because

- ☐ the weight of the transformer may be reduced
- ☒ rusting of the core may be prevented
- ☐ ratio of voltage in primary and secondary may be increased
- ☐ energy losses due to eddy currents may be minimized

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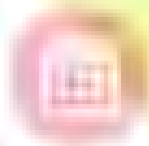


QUIZ RESULT

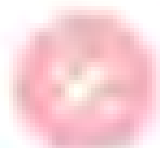
Practice test 4 Unit 9



Time



Score



0%

0/10

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Q : If the current in the primary coil and number of turns in it are I_P and N_P respectively and the number of turns and current in the secondary are N_S and I_S respectively then the value the of $N_S:N_P$

☐ $I_S : I_P$

☒ $I_P : I_S$

☐ $I_S^2 : I_P^2$

☐ $I_P^2 : I_S^2$

Explanation

$$\frac{I_P}{I_S} = \frac{V_S}{V_P} \dots\dots\dots 2$$

Equation equation (1) and (2)

$$\frac{N_S}{N_P} = \frac{I_P}{I_S}$$



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Correct



Unanswered



Incorrect



2/10

Q : The device in which induced e.m.f is statically induced e.m.f is



Transformer



Generator



Alternator



Dynamic

Explanation

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In transformer, both primary and secondary coil at rest. So induced emf is produced statically.



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Incorrect



3

Q : Step up transformer has transformation ratio of 3 :2 what is voltage in secondary if voltage in primary is 30 V?



45V



15V



90V



300V

Explanation

As,

$$\frac{N_s}{N_p} = \frac{V_s}{V_p}$$

$$\frac{3}{2} = \frac{V_s}{30}$$

$$\Rightarrow V_s = 45V$$



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Correct



Unattempted



Incorrect



4/10

Q : Which of the following quantity remain same in the transformer



Current



Frequency



Voltage



All of these

Explanation

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Information



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Correct



5/10



Incorrect



5/10

Q : Power loss in actual transformer is due to_____



small output

—



eddy currents and magnetic hysteresis



soft iron core



back emf

Explanation

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Two main causes of power loss in transformer

Eddy current

Hysteresis loss



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Correct



6/10



Incorrect



6/10

Q : The out put voltage of a transformer is 3 times the input voltage then turns ratio will be_____



1/3

—



3



1



6

Explanation

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$$V_s = 3V_p$$

$$\frac{V_s}{V_p} = 3$$

$$\frac{N_s}{N_p} = \frac{V_s}{V_p} = 3$$



Practice test 4 Unit 9



Correct



Unattempted



Incorrect



7/10

Q : In a transformer 220 ac voltage is increased to 2200 volts. If the number of turns in the secondary are 2000, then the number of turns in the primary will be.

A

100

B

150

C

200

D

20

Explanation

$$\frac{V_p}{V_s} = \frac{N_p}{N_s} \Rightarrow N_p = \left(\frac{220}{2200} \right) 2000 = 200$$



Q : If the current in the primary coil and number of turns in it are I_p and N_p respectively and the number of turns and current in the secondary are N_s and I_s respectively then the value the of $N_s:N_p$

A

$I_s : I_p$

B

$I_p : I_s$

C

$I_s^2 : I_p^2$

D

$I_p^2 : I_s^2$

Explanation

$$\frac{N_s}{N_p} = \frac{V_s}{V_p}$$

As we know that

$$P_p = P_s; V_p I_p = V_s I_s$$

$$\frac{I_p}{I_s} = \frac{V_s}{V_p}$$

$$\text{So, } \frac{N_s}{N_p} = \frac{I_p}{I_s}$$



Correct



Unattempted



Incorrect



9/10

Q : If electron is moving from A to B in wire Ab, then current induced in the coil is

A

anticlockwise

B

clockwise

C

no current will be induced

D

arbitrary direction

Explanation

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current will be induced if change in flux take place



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Correct



Unattempted



Incorrect



10/10

Q:

The core of a transformer is laminated because



the weight of the transformer may be reduced



rusting of the core may be prevented



ratio of voltage in primary and secondary may be increased



energy losses due to eddy currents may be minimized

Explanation

When there is change of flux in the core of a transformer due to change in current round it, eddy current is produced. The direction of this current is opposite to the current which produces it, so it will reduce the main current. We laminate the core so that flux is reduced resulting in the reduced production of eddy current.